

Catalogue of the Type Specimens of Amphibians and Reptiles in the Herpetological Museum of the Chengdu Institute of Biology, Chinese Academy of Sciences: II. Hynobiidae (Amphibia, Urodela)

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Abstract In order to facilitate herpetological research for herpetologists in and outside of China, we will report all the type specimens of Amphibia and Reptilia deposited in the Herpetological Museum of the Chengdu Institute of Biology (CIB), Chinese Academy of Sciences (CAS) in series. This report focuses on the type specimens of the family Hynobiidae of Urodela in Amphibia, which comprises seven species. Each entry provides the genus name, species name, information of the original description, the catalog number of holotype, sex, type locality, information of allotype (if any) and paratype, number and distribution of deposited specimens, and comments where they are appropriate.

Keywords type specimen, catalogue, hynobiid salamander, museum

1. Introduction

The type specimens and their original descriptions are very important to species identification. In order to facilitate herpetological research for herpetologists in and outside of China, all the type specimens of Amphibia and Reptilia deposited in the Herpetological Museum of CIB will be reported in series. Presently, catalogues on the family Rhacophoridae (Amphibia: Anura) (Li *et al.*, 2011) and some reptiles (Guo *et al.*, 1999) have been reported. As part of the report series, the type specimens of the family Hynobiidae (Amphibia: Urodela) deposited in this Museum are reported in this paper.

Hynobiidae is one of the most diverse families of salamanders, and encompasses 58 species belonging to nine genera (AmphibiaWeb, 2012). Except for *Salamandrella keyserlingii* which is present in Europe, occurring in northern Russia (Wake, 2003), all others are restricted to Asia, and therefore, extant hynobiid

salamanders are considered exclusively Asian (Fu, 2003). China is the main distributional range of hynobiid salamanders, including 29 species in eight genera (24 species in the Mainland of China, and five species in Taiwan, China; AmphibiaWeb, 2012), and four genera and 21 species endemic to China. 5785 specimens (belonging to 16 species, including the type specimens of seven species) of hynobiid salamanders are deposited in the Herpetological Museum of CIB, CAS. In this paper, the type specimens of seven species of hynobiids are reported.

2. Material and Methods

Classification of taxa mainly follows Fei *et al.* (2006), AmphibiaWeb (2012) and Xia *et al.* (2012). All information for each type specimen of the seven species is presented in the following format: genus name, species name, information of the original description, the catalog number of holotype, sex, type locality, information of allotype (if any) and paratype, number and distribution of deposited specimens, except *Pseudohynobius kuankuoshuiensis*. Additional notes on each species are provided where relevant, under the heading “Comments”.

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3. List of Type Specimens

Genus *Batrachuperus*

Batrachuperus londongensis Liu and Tian, 1978

Batrachuperus londongensis Liu and Tian, 1978 was described as a new species in Materials for Herpetological Research, 1978, 4: 18.

Holotype: CIB 65I0013, an adult male (Figure 1).

Type locality: Longdong River, Mount Emei (Mt. Emei), Sichuan, China.

Allotype: CIB 638900, a female, same locality as type.

Paratype: No data.

Other deposited specimens: 53 collected specimens.

Distribution of all the deposited specimens: Longdong River [CIB 570161, CIB 620590–620593, CIB 638172, CIB 638865–638867, CIB 638892, CIB 65I0012, CIB 65I0014–65I0015, CIB 760033–760036, CIB 760038–760039, CIB 78009–780014, CIB 838173, CIB 99I0511–99I0520, CIB 川 (Sichuan) 00196–00197, CIB 川 00199–00200, CIB 川 00202–00203] and Toudaohe (CIB 98II1352, CIB 98II1389, CIB 98II1390–98II1391, CIB 98II1393–98II1394, CIB 99I0521–99I0525) in Emei, Sichuan.

Comments: The diagnosis of *B. londongensis* was first described in brief by Liu *et al.* (1978), and then Fei *et al.* (1983) described the morphology, color pattern, eggs, and ecological habitat of *B. londongensis*. Fei *et al.* (2005) thought only the Longdong River population from Mt. Emei is *B. londongensis*. However, the molecular data showed that the Toudaohe and Longdong River populations from Mt. Emei, Sichuan, the Wawushan and Gaomiao populations from Hongya County, Sichuan, and the Jiurang populations from Hanyuan County, Sichuan all belong to *B. londongensis* (Zeng, 2004; Fu *et al.*, 2008; Xia *et al.*, 2012; Lu *et al.*, 2012). Furthermore, Fu *et al.* (2008) thought that most populations from Mt. Emei (except from its summit) are *B. londongensis*. Because the distribution of *B. londongensis* and *B. pinchonii* is overlapping in Mt. Emei and Daxiangling, the populations from the above distribution areas of the deposited specimens are affirmed by molecular data. We are not sure if the populations of other 234 deposited specimens (CIB 100001–100005, CIB 561022–561024, CIB 561517–561519, CIB 561521–561523, CIB 561691–561705, CIB 561707–561713, CIB 561715–561723, CIB 561725–561726, CIB 561730–561733, CIB 561735, CIB 561737–561744, CIB 562248, CIB 562250–562251, CIB 562253, CIB 562256–562260, CIB 562271–562276, CIB 562278–562280, CIB 570032–570039, CIB 570044–570045, CIB 570082–570084, CIB 570087–570088, CIB

570091–570093, CIB 570085–570103, CIB 570105, CIB 570107–570109, CIB 570112, CIB 570116–570121, CIB 570123–570129, CIB 570132, CIB 570134–570137, CIB 570139–570147, CIB 570150–570151, CIB 570153–570154, CIB 570156–570157, CIB 570159–570160, CIB 570162–570163, CIB 570165–570169, CIB 570173–570177, CIB 570180–570181, CIB 573272–573275, CIB 638174–638182, CIB 638184–638189, CIB 638852–638855, CIB 638869–638876, CIB 638878–638886, CIB 638888–638889, CIB 638902, 65I0017–65I0022, CIB 740464–740465, CIB 740486, CIB 740499–740501, CIB 740504–740521 in Mt. Emei, and CIB 99I0526–99I0527 in Hongya, Sichuan) are also *B. londongensis* because of the absence of support from molecular data.

Genus *Pseudohynobius*

Pseudohynobius flavomaculatus (Hu and Fei, 1978)

Hynobius flavomaculatus (Hu and Fei, 1978) was described as a new species in Materials for Herpetological Research, 1978, 4: 20.

Holotype: CIB 770041, an adult male (Figure 2).

Type locality: Hanchi, Lichuan County, Hubei, China.

Allotype: CIB 79I0103, a female, same locality as type.

Paratype: CIB 79I0107, a male, same locality as type.

Other deposited specimens: 73 collected specimens.

Distribution of all the deposited specimens: Lichuan (CIB 74I0711, CIB 74I0720, CIB 74I0723–74I0732, CIB 74I0749–74I0750, CIB 74I0787–74I0788, CIB 74I0799–74I0815, CIB 74I0920–74I0923, CIB 74I0973–74I0975, CIB 74I1066–74I1069, CIB 79I0043, CIB 79I0077–79I0078, CIB 79I0080–79I0082, CIB 79I0086–79I0092, CIB 79I0094, CIB 79I0096–79I0101, CIB 79I0104–79I0106, CIB 79I0108–79I0109, CIB 79I2067, CIB 79I2099, CIB 79I3000, CIB 99I0528) in Hubei.

Comments: The diagnosis of *H. flavomaculatus* was first described in brief based on the holotype CIB 770041 (a male), allotype CIB 770043, and paratype (two males, and 69 larvae) by Hu *et al.* (1978). Then, Fei and Ye (1982) described *H. flavomaculatus* based on the holotype CIB 79I0107 (a male), allotype CIB 79I0103, and paratype (27 males, 14 females, and 90 larvae). Fei and Ye (1983) erected the new genus *Pseudohynobius* based on *H. flavomaculatus*, and transferred *Ranodon tsinpaensis* Liu and Hu, 1966 into the genus *Pseudohynobius* as *P. tsinpaensis*. Zhao (1990), Zhao and Wu (1995) considered that *P. flavomaculatus* is the synonym of *R. tsinpaensis*, and the genus *Pseudohynobius* is invalid. However, the molecular phylogeny supports the validity of the genus *Pseudohynobius* and the species *P. flavomaculatus* (Li *et al.*, 2004; Wang *et al.*, 2005; Zeng *et al.*, 2006; Zhang *et al.*, 2006; Xia *et al.*, 2012). Fei *et al.* (2006)

showed that the distribution of *P. flavomaculatus* includes Nanchuan (Chongqing), Suiyang (Guizhou), Lichuan (Hubei), and Sangzhi (Hunan). Zeng *et al.* (2006) suggested that the Nanchuan and Suiyang populations are two cryptic species based on the molecular data, and these two cryptic species were described by Xu *et al.* (2007) and Wei *et al.* (2009), respectively. In addition to the above listed 73 specimens, 110 other specimens were recorded and preserved as *P. flavomaculatus*, but the original records of them are missing.

***Pseudohynobius puxiongensis* (Fei and Ye, 2000)**

Protyhynobius puxiongensis (Fei and Ye, 2000) was described as a new species in *Cultum Herpetologica Sinica*, 2000, 8: 64–70.

Holotype: CIB 65110220, an adult male (Figure 3).

Type locality: Puxiong, Yuexi County, Sichuan, China.

Paratype: No data.

Other deposited specimens: No collected specimens.

Comments: Fei and Ye (2000) described *Pr. puxiongensis* based on a single specimen. Peng *et al.* (2010) later transferred *Pr. puxiongensis* into the genus

Pseudohynobius as *P. puxiongensis* based on molecular data of rediscovered specimens, and Xiong *et al.* (2011) redescribed the features of its adult, larvae, egg sacs, karyotype, breeding habitat and habits of *P. puxiongensis* based on the rediscovered specimens.

***Pseudohynobius jinbo* Wei, Xiong and Zeng, 2009**

Pseudohynobius jinbo was described as a new species by Wei, Xiong and Zeng in *Zootaxa*, 2009, 2149: 62–68.

Holotype: CIB 85290, an adult male (Figure 4).

Type locality: A spring pond on Mt. Jinbo, Nanchuan County, Chongqing, China.

Paratype: CIB 85291 (a male), CIB 85292 and CIB85293 (two larvae), same locality as type.

Other deposited specimens: 182 collected specimens.

Distribution of all the deposited specimens: Nanchuan (CIB 561377, CIB 561418–561419, CIB 561457, CIB 561476–561477, CIB 561479–561498, CIB 562312–562321, CIB 562324–562338, CIB 562340–562355, CIB 562357, CIB 56524–56529, CIB 56537–56541, CIB 56543–56556, CIB 56560–56563, CIB 56565–56568, CIB 56570–56599, CIB 56612, CIB 56614–56628, CIB

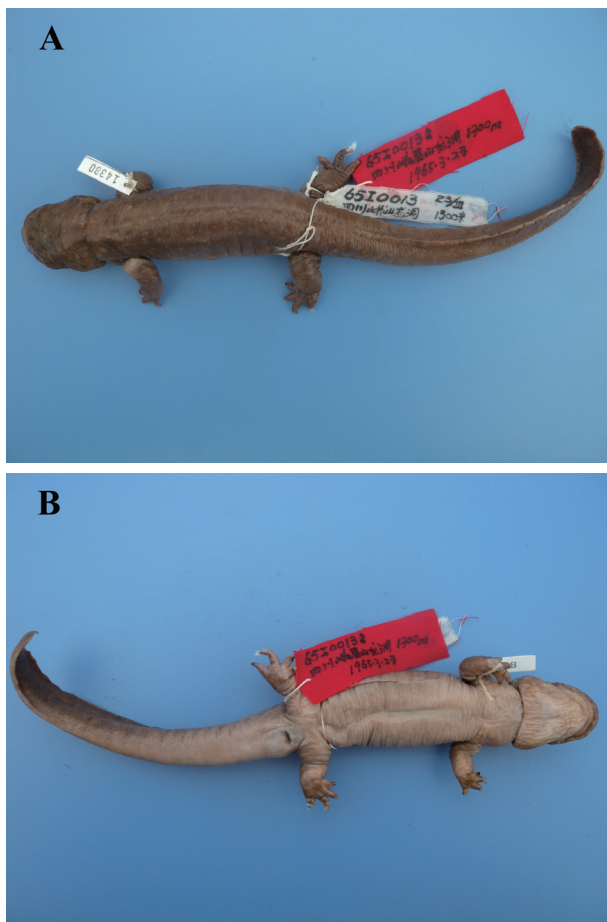


Figure 1 Dorsal (A) and ventral (B) views of the holotype of *Batrachuperus londongensis* Liu and Tian, 1978.

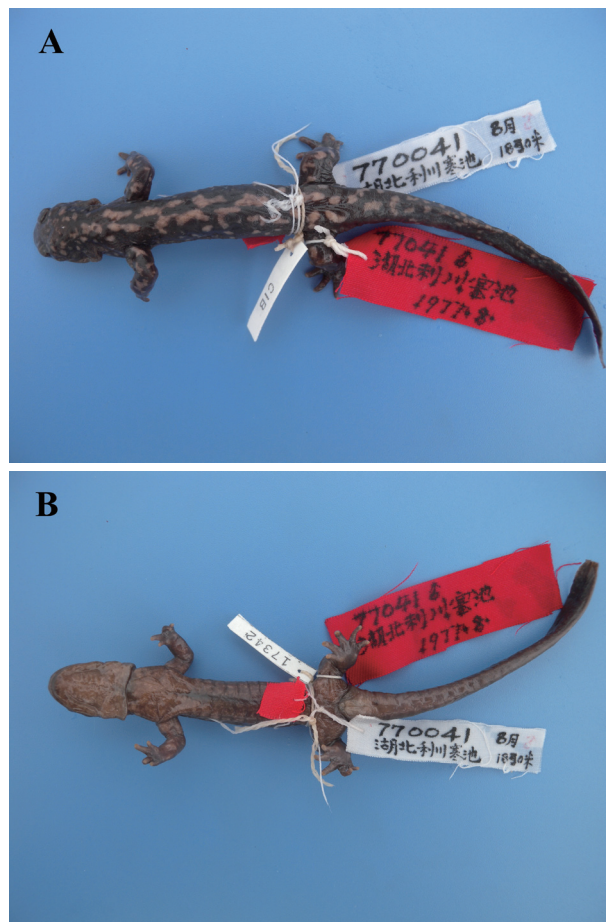


Figure 2 Dorsal (A) and ventral (B) views of the holotype of *Pseudohynobius flavomaculatus* (Hu and Fei, 1978).

56784–56813, CIB 56996–56999) in Chongqing.

Comments: Previously, *P. jinbo* was considered as a population of *P. flavomaculatus* (Fei *et al.*, 2006), Zeng *et al.* (2006) suggested it is a cryptic species based on the molecular data, and Wei *et al.* (2009) described it then.

***Pseudohynobius kuankuoshuiensis* Xu *et al.*, 2007**

Pseudohynobius kuankuoshuiensis Xu *et al.*, 2007 was described in Acta Zootaxonomica Sinica, 2007, 32: 230–233.

Paratype: CIB 88063, CIB 88071 and CIB 88072, three larvae, collected from Nianfanggou in Kuankuoshui Tree Farm, Suiyang County, Guizhou, China.

Other deposited specimens: No collected specimens.

Comments: Previously, *P. kuankuoshuiensis* was considered as a population of *P. flavomaculatus* (Fei *et al.*, 2006), Zeng *et al.* (2006) suggested it is a cryptic species based on the molecular data, and Xu *et al.* (2007) described it. The holotype (7504023, an adult male) collected from Yinpo in Kuankuoshui Tree Farm, Suiyang County, Guizhou, China is deposited in Zunyi Medical

University, Guizhou.

Genus *Liua*

***Liua shihi* (Liu, 1950)**

Ranodon wushanensis (= *Hynobius shihi* Liu, 1950 = *Ranodon shihi* Risch and Thorn, 1981) was published in Acta Zoologica Sinica, 1960, 12: 278–292.

Holotype: CIB 571598, an adult male (Figure 5).

Type locality: Kwanyang, Wushan County (Now belongs to Chongqing. The same below), Szechwa (Sichuan), China.

Paratype: CIB 571717 (a larva), same locality as type.

Other deposited specimens: 699 collected specimens.

Distribution of all the deposited specimens: Wushan (CIB 100769–100783, CIB 100785–100811, CIB 100813–100831, CIB 100833–100871, CIB 571397–571431, CIB 571433–571438, CIB 571439–571446, CIB 571449–571462, CIB 571466–571467, CIB 571469–571474, CIB 571476–571479, CIB 571481–571489, CIB 571491–571503, CIB 571505, CIB 571508–571525, CIB 571527–571532, CIB 571555–571561, CIB 571563–571568, CIB 571572–571574, CIB 571576–571578, CIB

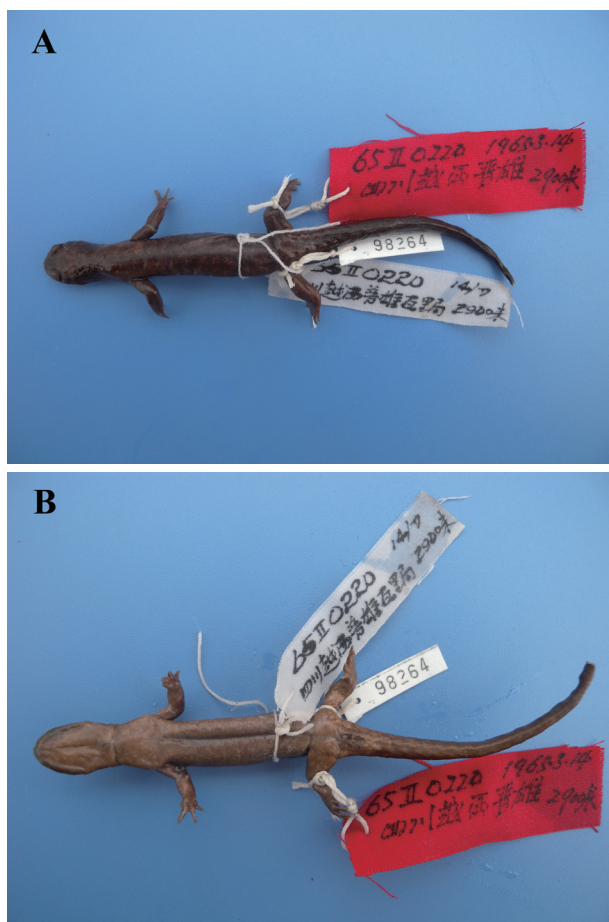


Figure 3 Dorsal (A) and ventral (B) views of the holotype of *Pseudohynobius puxiongensis* (Fei and Ye, 2000).

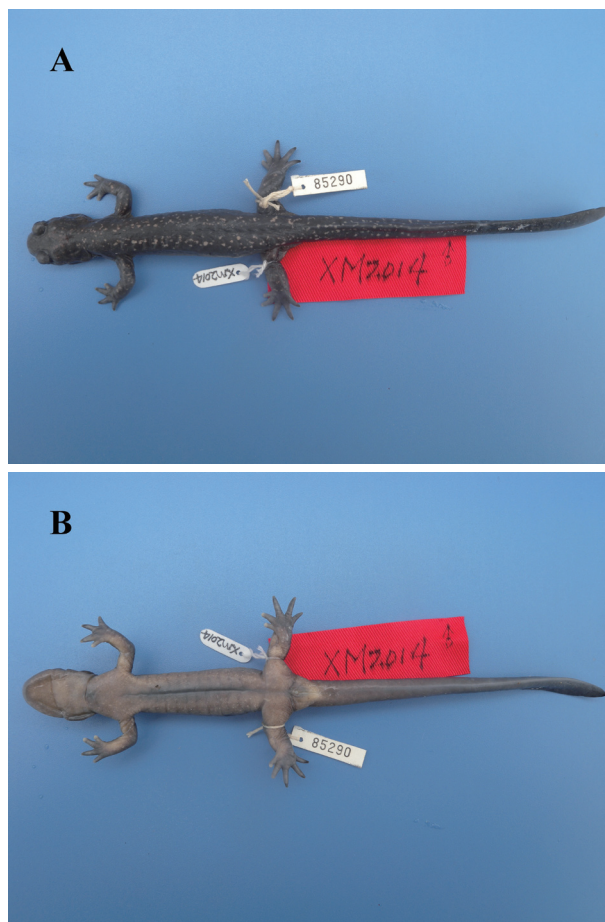


Figure 4 Dorsal (A) and ventral (B) views of the holotype of *Pseudohynobius jinbo* Wei, Xiong and Zeng, 2009.

571580–571588, CIB 571591, CIB 571593–571594, CIB 571596–571597, CIB 571599, CIB 571601–571624, CIB 571627–571629, CIB 571631–571632, CIB 571634–571635, CIB 571637–571646, CIB 571648–571657, CIB 571659–571664, CIB 571666–571668, CIB 571670–571680, CIB 571682–571683, CIB 571685–571690, CIB 571692–571694, CIB 571696–571716, CIB 571718–571720, CIB 571722–571726, CIB 571728–571729, CIB 571731–571733, CIB 571754–571755, CIB 571786, CIB 571809, CIB 571937–571938, CIB 571955–571957, CIB 571959–571961, CIB 571963–571978); Wuxi (CIB S0276–S0289) and Chengkou (CIB 750003–750004) in Chongqing; Shenlongjia (CIB 79I0282–79I0287, CIB 79I0299–79I0311, CIB 79I0313–79I0317, CIB 79I0319–79I0369, CIB 79I0375–79I0381, CIB 79I0591–79I0593, CIB 79I0614–79I0640, CIB 79I0642–79I0649, CIB 79I0651–79I0661, CIB 79I0663–79I0668, CIB 79I0670–79I0687, CIB 79I0690–79I0693, CIB 79I0695–79I0737, CIB 79I0756–79I0773, CIB 79I0775–79I0786, CIB 79I0813–79I0818, CIB 79I0820, CIB 79I0822–79I0827, CIB 79I0895–79I0896, CIB 79I0898–79I0917, CIB

79I0919–79I0925) in Hubei.

Comments: Liu (1950) first described it a new species, *H. shihi*, based on the specimens from Chisinling, Tachangsze, eastern Szechwa (Sichuan), China. Then, Liu *et al.* (1960) described *R. wushanensis* based on the specimens from Kwanyang, Wushan County, Szechwa (Sichuan), China, and declared that *H. shihi* is the smaller specimens of *R. wushanensis*. Risch and Thorn (1981) regarded *R. wushanensis* as a junior synonym of *H. shihi*, and recombined them as *R. shihi*. Zhao and Hu (1983) erected a new genus *Liua* based on *R. wushanensis*. Huang *et al.* (1992) and Fei *et al.* (2006) considered that the diagnosis of the genus *Liua* cannot effectively distinguish the genus *Liua* from the genus *Ranodon*, so the genus *Liua* was not valid, and *R. shihi* should be assigned in the genus *Ranodon*. However, the molecular data supports the validity of the genus *Liua* (Li *et al.*, 2004; Wang *et al.*, 2005; Zeng *et al.*, 2006; Zhang *et al.*, 2006; Xia *et al.*, 2012). In addition to the listed 699 specimens of *L. shihi*, whose populations are affirmed by molecular data, 52 other specimens have

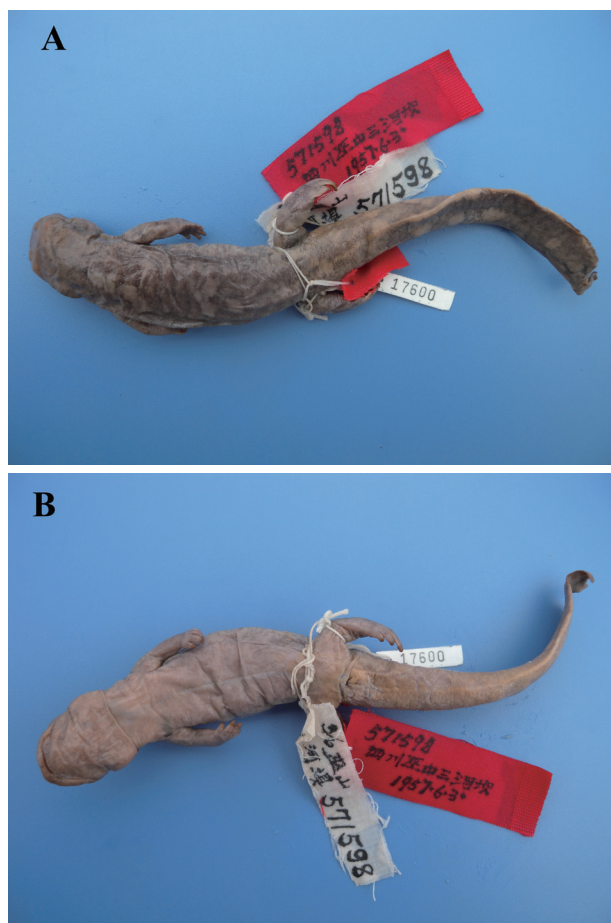


Figure 5 Dorsal (A) and ventral (B) views of the holotype of *Liua shihi* (Liu, 1950).

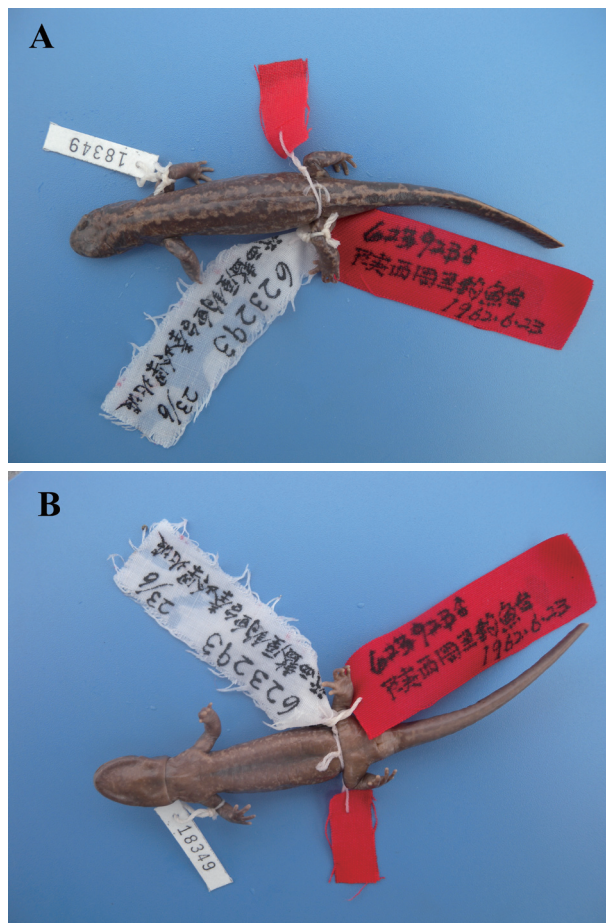


Figure 6 Dorsal (A) and ventral (B) views of the holotype of *Liua tsinpaensis* (Liu and Hu, 1966).

recorded and preserved as *L. shihi*, but the molecular data of these populations are absent. These 52 specimens are distributed in Yichang (CIB 74I1076–74I1089, CIB 74I1106–74I1108, CIB 74I1112–74I1117, CIB 74I1124–74I1133), Lichuan (CIB 80801–80811), and Badong (CIB 79II0363–79II0370) in Hubei.

Liua tsinpaensis (Liu and Hu, 1966)

Ranodon tsinpaensis (Liu and Hu, 1966) was described as a new species in *Acta Zoologica Sinica*, 1966, 18: 57–89. Holotype: CIB 623293, an adult male (Figure 6).

Type locality: Hou-tseng-tze, Chouchih Hsien, Shensi (Shaanxi), China.

Paratype: No data.

Other deposited specimens: 17 collected specimens.

Distribution of all the deposited specimens: Wanyuan (CIB 610102, CIB 610134, CIB 610214–610215, CIB 610357–610358) in Sichuan; Zhouzhi (CIB 623282–623283, CIB 623285, CIB 623291, CIB 623294–623295, CIB 623297–623300, CIB 623302) in Shaanxi.

Comments: Fei and Ye (1983) transferred *Ranodon tsinpaensis* into the genus *Pseudohynobius* as *P. tsinpaensis*. Zhao (1990), and Zhao and Wu (1995) considered that the genus *Pseudohynobius* is invalid, and *R. tsinpaensis* should retain in the genus *Ranodon*. The molecular data shows that *R. tsinpaensis* should be assigned into the genus *Liua* (Li *et al.*, 2004; Zeng *et al.*, 2006), and Zeng *et al.* (2006) transferred *R. tsinpaensis* into the genus *Liua* as *L. tsinpaensis*. Besides the above listed 17 specimens, 110 other specimens were recorded and preserved as *L. tsinpaensis*, but the original records of them are missing.

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